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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,668	10/24/2003	Naveen Bali	5693P033	9966
48102 7590 12/19/2007 NETWORK APPLIANCE/BLAKELY 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040			EXAMINER ALAM, SHAHID AL	
			ART UNIT 2162	PAPER NUMBER
			MAIL DATE 12/19/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Interview Summary

Application No.

10/692,668

Applicant(s)

BALI ET AL.

Examiner

Shahid Al Alam

Art Unit

2162

All participants (applicant, applicant's representative, PTO personnel):

(1) Shahid Al Alam.(3) Dermot Miller, REg. No. 58,309.(2) David Madden.

(4) \_\_\_\_\_.

Date of Interview: 17 December 2007.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.

If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 1.

Identification of prior art discussed: Voigt.


Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: We discussed similarity and difference between the claim language and prior art of record. Applicant will submit response shortly.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
SHAHID ALAM  
PRIMARY EXAMINER

Examiner's signature, if required

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**Deliver To:** Examiner Shahid Al Alam  
**Company:** U.S. Patent & Trademark Office  
**Fax:** 571-273-4030  
**From:** David Madden  
**Date:** Sunday, December 16, 2007  
**Time:** 16:58:28 PST/PDT (GMT-7/8)  
**Pages:** 14 + this cover page  
**Operator:** DHM  
**Our Reference:** 5693P033

<b>Subject:</b>	Your reference no. 10/692,668
<b>Remarks:</b>	Interview Request and supporting materials for telephone interview on 17 December 2007 at 3:00 p.m.

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PTOL-413A (09-04)

Approved for use through 07/31/2005. OMB 0851-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

## Applicant Initiated Interview Request Form

Application No.: 10/692,668 First Named Applicant: Naveen Bali  
 Examiner: Shahid Al Alam Art Unit: 2162 Status of Application: Non-final OA

## Tentative Participants:

(1) Dermot Miller (2) David Madden

(3) \_\_\_\_\_ (4) \_\_\_\_\_

Proposed Date of Interview: 17 December 2007 Proposed Time: 3:00 (AM/PM) ☒

## Type of Interview Requested:

(1) ☒ Telephonic (2) ☐ Personal (3) ☐ Video ConferenceExhibit To Be Shown or Demonstrated: ☐ YES ☒ NO

If yes, provide brief description: \_\_\_\_\_

## Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art Voigt	Discussed	Agreed	Not Agreed
(1) <u>Rej.</u>	<u>1</u>	<u>Voigt</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Continuation Sheet Attached					

## Brief Description of Arguments to be Presented:

(See attached sheets)

An interview was conducted on the above-identified application on \_\_\_\_\_

**NOTE:** This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

  
 Applicant/Applicant's Representative Signature

Examiner/SPE Signature

Dermot G. Miller

Typed/Printed Name of Applicant or Representative

58,309

Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PATENT  
Attorney's Docket No. 5693P033

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	) Examiner: Alam, Shahid Al
Naveen Bali, Raymond C. Chen, Kayuri	) Art Group: 2162
Patel and Alexander D. Petruncola	)
Application No. 10/692,668	)
Filed: October 24, 2003	)
For: VERIFICATION OF FILE SYSTEM LOG	)
DATA USING PER-ENTRY CHECKSUMS	)

To Examiner's Fax:  
(571)273-4030

INTERVIEW AGENDA

In connection with the Applicant-Initiated Interview Request Form transmitted herewith, Applicants respectfully request that the Examiner review the application and references of record as necessary to discuss the remarks presented at page 7.

IN THE CLAIMS

The presently-pending claims are:

1. (Previously Presented) A method comprising:  
maintaining a log of a plurality of requests in a storage server, each of the requests corresponding to a write operation to be performed by the storage server on a set of storage devices, the log including a separate log entry for each of the requests;  
and  
including a separate checksum in each of the log entries, each checksum for use by a checksum algorithm in determining data integrity of the corresponding log entry.
2. (Original) A method as recited in claim 1, wherein the requests originate from a set of client devices serviced by the storage server.
3. (Original) A method as recited in claim 1, further comprising selecting the checksum algorithm based on a desired balance between performance and checksum strength.
4. (Original) A method as recited in claim 1, further comprising automatically selecting the checksum algorithm based on a predetermined criterion.
5. (Original) A method as recited in claim 4, further comprising including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms, wherein said automatically selecting the checksum algorithm comprises selecting the checksum algorithm dynamically by modifying the algorithm variable during operation of the storage server.

6. (Original) A method as recited in claim 1, further comprising:  
including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms; and  
automatically selecting the checksum algorithm dynamically by modifying the algorithm variable during operation of the storage server.
7. (Original) A method as recited in claim 1, further comprising including a separate algorithm variable in each of the log entries, to specify a checksum algorithm to be used separately for each said log entry.
8. (Original) A method as recited in claim 1, further comprising:  
maintaining an entry count in the log to indicate the number of log entries in the log; and  
using the checksum of one of the log entries to determine whether the entry count is corrupted.
- 9 – 23 (Canceled)
24. (Previously Presented) A storage server comprising:  
means for receiving a plurality of requests from a set of client devices, each request corresponding to a operation to be performed by the storage server in relation to a set of storage devices; and  
means for maintaining a log of the requests in the storage server, the log including a separate log entry for each of the requests, the log further including a separate checksum in each of the log entries, each checksum for use by a checksum algorithm in determining data integrity of the corresponding log entry.
25. (Original) A storage server as recited in claim 24, further comprising means for selecting the checksum algorithm based on a desired balance between performance and checksum strength.

26. (Original) A storage server as recited in claim 24, further comprising means for automatically selecting the checksum algorithm based on a predetermined criterion.

27. (Original) A storage server as recited in claim 26, further comprising means for including an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms, wherein said means for automatically selecting the checksum algorithm comprises means for selecting the checksum algorithm dynamically by modifying the algorithm variable during operation of the storage server.

28. (Original) A storage server as recited in claim 24, further comprising:  
an algorithm variable in the log to select the checksum algorithm from a plurality of selectable checksum algorithms; and  
means for automatically selecting the checksum algorithm dynamically by modifying the algorithm variable during operation of the storage server.

29. (Original) A storage server as recited in claim 24, further comprising means for including a separate algorithm variable in each of the log entries, to specify a checksum algorithm to be used separately for each said log entry.

30. (Original) A storage server as recited in claim 24, further comprising:  
means for maintaining an entry count in the log to indicate the number of log entries in the log; and  
means for using the checksum of one of the log entries to determine whether the entry count is corrupted.

31. (Original) A storage server as recited in claim 24, wherein the storage appliance is a network appliance.



32. (Previously Presented) A method for operating a network-accessible data storage server, comprising:

- receiving a plurality of storage requests from at least one client;
- preparing a plurality of log entries, each log entry of the plurality of log entries corresponding to one storage request of the plurality of storage requests, and each log entry including a checksum of the log entry; and
- storing the plurality of log entries in a non-volatile random access memory ("NVRAM").

33. (Previously Presented) The method of claim 32, further comprising:  
preparing a log header containing a count of the plurality of log entries; and  
storing the log header in the NVRAM.

34. (Previously Presented) The method of claim 33, further comprising:  
storing a monotonically increasing serial number in each of the plurality of log entries;  
identifying a minimum serial number of the plurality of log entries as a start serial number;  
verifying a log entry with a serial number equal to a sum of the start serial number and the count of the plurality of log entries; and  
verifying a log entry with a serial number equal to a sum of the start serial number and the count of the plurality of log entries and one.

35. (Previously Presented) The method of claim 33 further comprising:  
computing a checksum of the log header and storing the checksum with the log header in the NVRAM.

**IN THE DRAWINGS**

The Examiner stated that the informal drawings submitted with the application were of insufficient quality to permit examination. Accordingly, replacement drawing sheets in compliance with 37 C.F.R. 1.121(d) are submitted with the present Response. These sheets are marked "Replacement Sheet" in the top margin. Approval of these replacement drawings is respectfully requested.

REMARKS

Applicants have argued that the primary reference used to reject the pending claims (U.S. Patent No. 6,055,604 to Voigt *et al.*, "*Voigt*") creates log messages memorializing different events than recited in the pending claims, and that *Voigt* does not maintain a count of entries in the log. The Examiner disagreed with these contentions.

As to the content of log entries, Applicants present the following step-by-step analysis, and seek the Examiner's help in determining where the analysis goes awry.

First, a "log," as used in Applicants' specification and in *Voigt*, is "a journal or record in which is noted sequential data on the speed or progress or performance of something," Webster's Third New International Dictionary. This is consistent with common computer usage of the term: a log collects messages describing the occurrence and/or status of certain events to provide an audit trail that may help in troubleshooting. (*See, for example*, Wikipedia at "computer data logging.") For concreteness, let us say that a log is a list of one or more entries, where each entry corresponds to an event or occurrence.

This leads to the second question: *what* does each log entry correspond to? In Applicants' invention, a log entry corresponds to a write request received by a storage server. In contrast, *Voigt*'s log entries are created when a memory map changes (*see Voigt* 1:39-42 and 4:42-48). The log entries memorialize *different events*.

Third, both Applicants and *Voigt* impliedly or explicitly store the log entries on a disk. But because the log entries (and the underlying events) are different, the logs are also different. One cannot look at *Voigt*'s log and determine what write requests were received, nor can one look at Applicants' log and determine when memory map changes happened.

Applicants have attempted to express the difference between the inventive log and *Voigt*'s log in claim elements such as "a log of a plurality of requests in a storage server, each of the requests corresponding to a write operation to be performed by the storage server..." (claim 1) or "each log entry of the plurality of log entries corresponding to one storage request of the plurality of storage requests..." (claim 32).

It is believed that these elements clearly state what a log entry memorializes, and that the entries are different from *Voigt's* entries. If the Examiner disagrees, Applicants respectfully request his assistance in clarifying the difference.

As to the count of log entries, Applicants' dependent claims 8 and 30 require maintaining such a count. Furthermore, Applicants have argued that, although *Voigt's* log entries contain a sequence number (see Fig. 7, 120; and 8:28-30), the sequence number is different from a count. A sequentially-incremented number can only be used as a count if the sequence starts from 1 *and if all entries are available*. For example, if only entries with sequence numbers 98, 99 and 100 are available, then the count of entries is 3, not 100.

This is critical, because *Voigt* overwrites old log entries as new log entries are created – *Voigt's* log is *circular* (see 9:13-17). When *Voigt* uses its log for recovery, it goes from one record to the next according to the sequence numbers, and stops when it cannot find a "next" record. Since *Voigt* does not keep a count of valid entries, there is no way to determine whether this process found all the entries it should have found.

Applicants' log maintains a separate count of entries, which can be compared to the log entries located and processed. If the count is inaccurate, it may indicate that one or more log entries were corrupted.

**Blakely, Sokoloff, Taylor & Zafman LLP**

1279 Oakmead Parkway / Sunnyvale, CA 94085 / (408)720-8300

Title: Verification of File System Log Data using Per-Entry Checksums

First Named Inventor: Naveen Bali

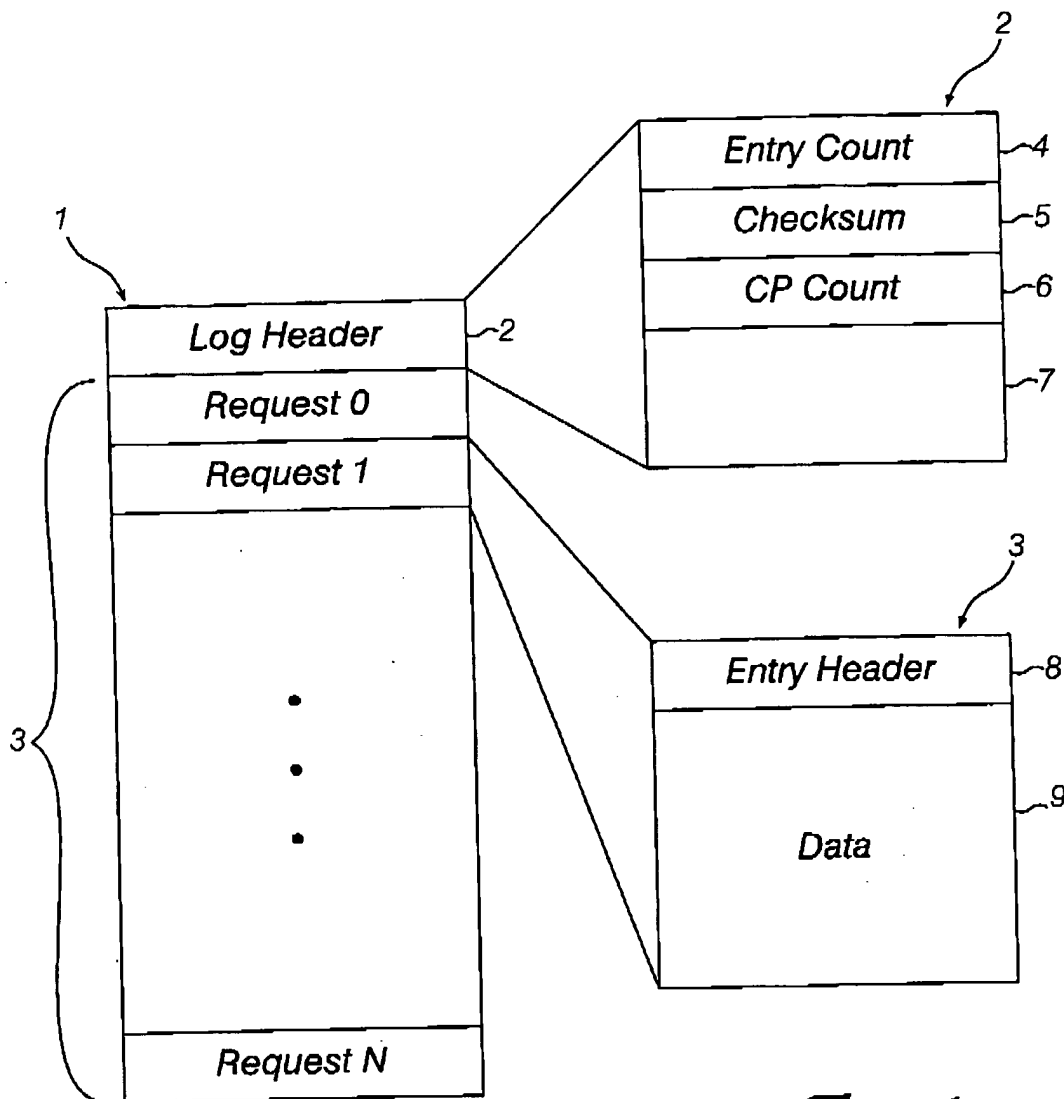
Application Serial No: 10/692,668

Sheet: 1 of 5

**Replacement Sheet**

Docket No.: 5693P033

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*Fig. 1*

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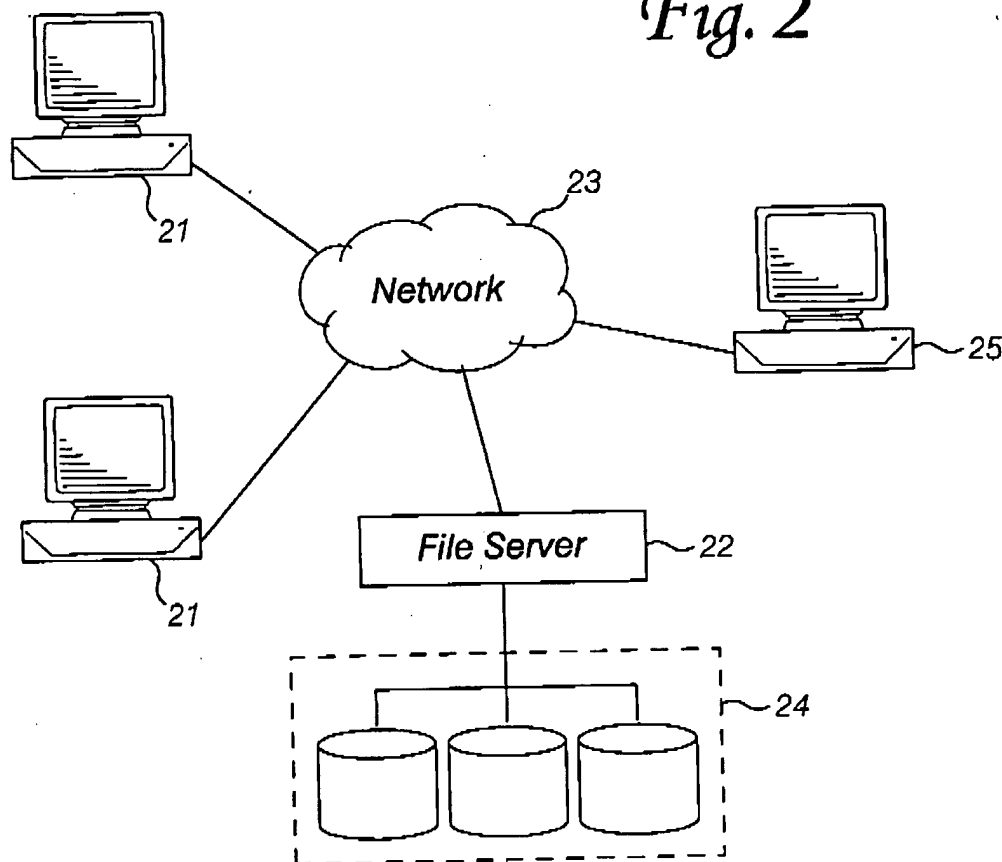
Title: Verification of File System Log Data using Per-Entry Checksums  
First Named Inventor: Naveen Bali  
Application Serial No: 10/692,668

Sheet: 2 of 5

**Replacement Sheet**

Docket No.: 5693P033

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*Fig. 2*

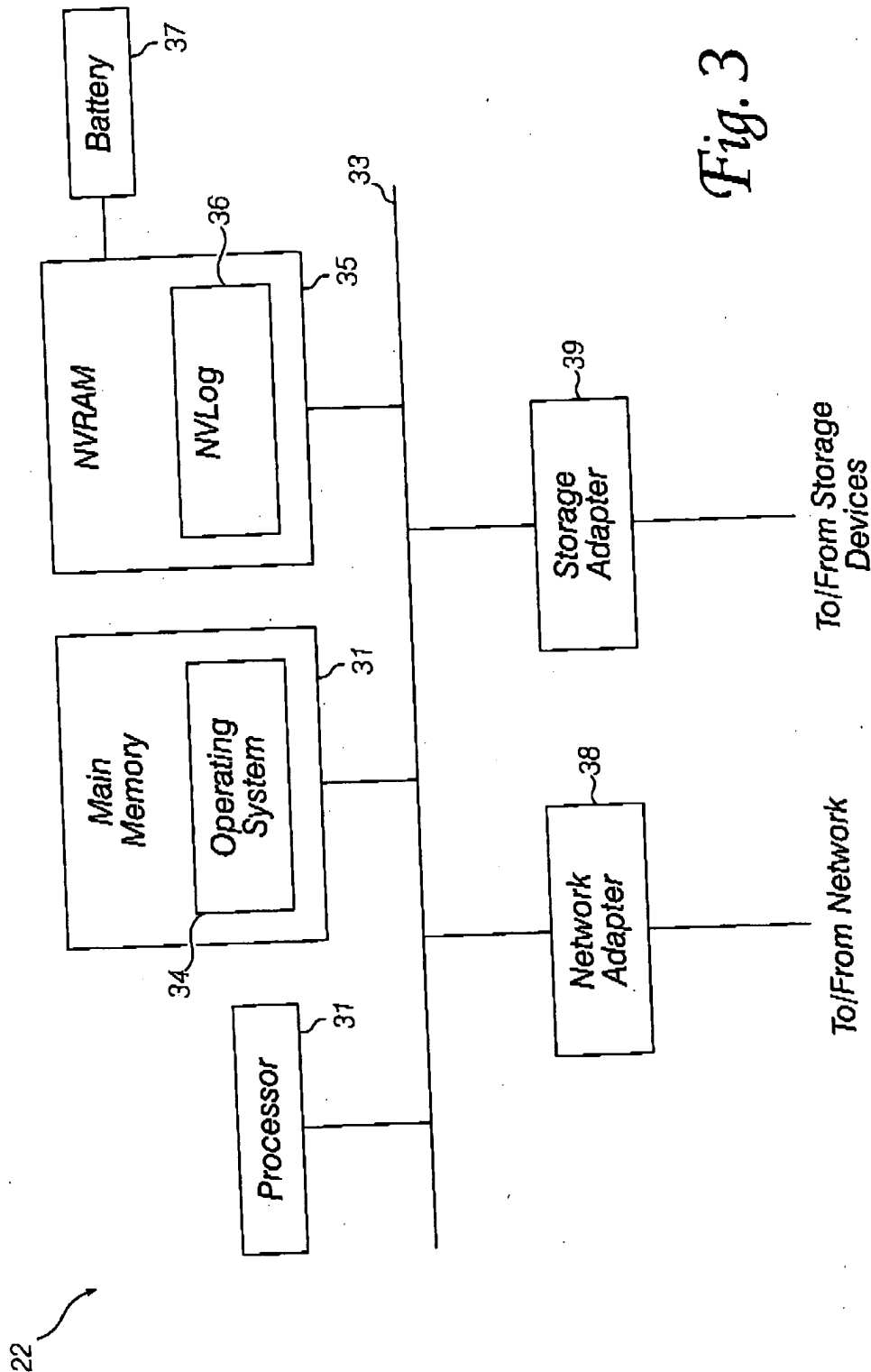
**Blakely, Sokoloff, Taylor & Zafman LLP**

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Title: Verification of File System Log Data using Per-Entry Checksums  
First Named Inventor: Naveen Bali  
Application Serial No: 10/692,668  
Sheet: 3 of 5**Replacement Sheet**

Docket No.: 5693P033

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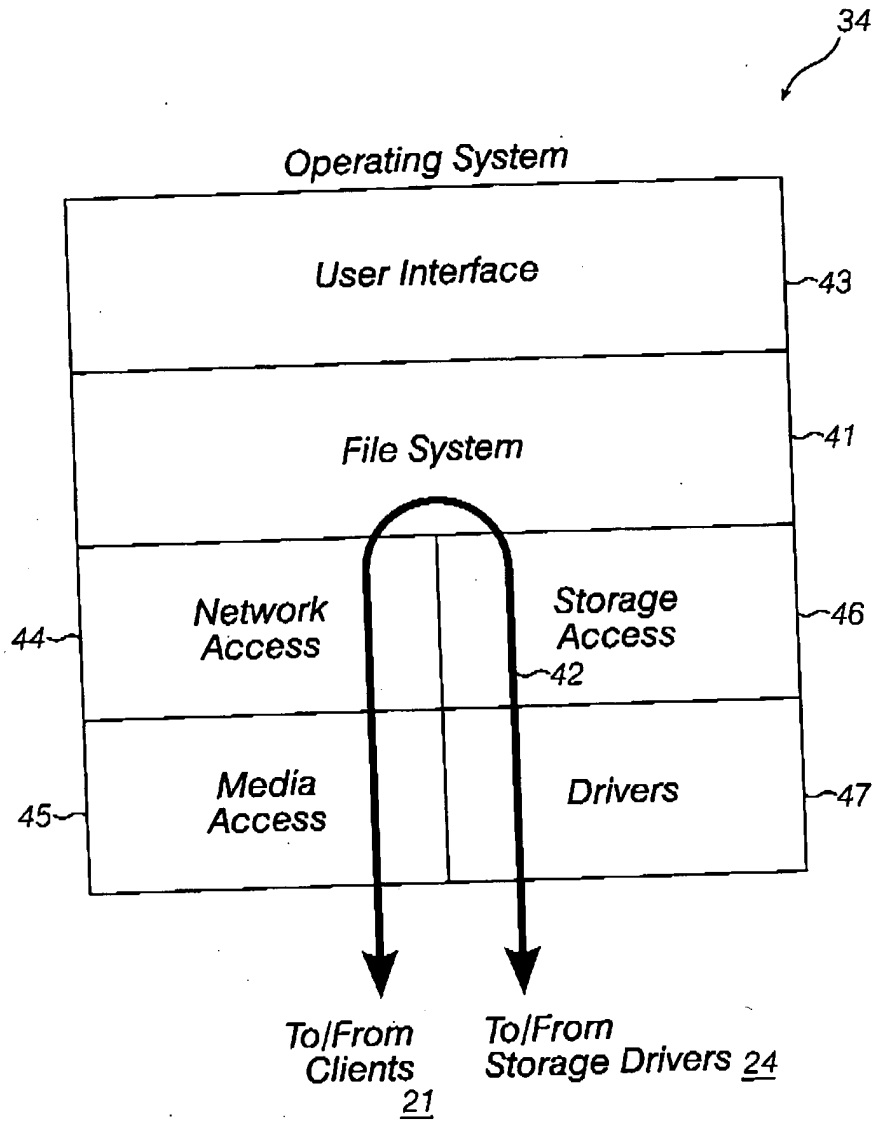
**Blakely, Sokoloff, Taylor & Zafman LLP**

1279 Oakmead Parkway / Sunnyvale, CA 94085 / (408) 720-8300

Title: Verification of File System Log Data using Per-Entry Checksums  
First Named Inventor: Naveen Ball  
Application Serial No: 10/692,668  
Sheet: 4 of 5**Replacement Sheet**

Docket No.: 5693P033

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*Fig. 4*



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Title: Verification of File System Log Data using Per-Entry Checksums  
 First Named Inventor: Naveen Ball  
 Application Serial No: 10/692,868  
 Sheet: 5 of 5

**Replacement Sheet**

Docket No.: 5693P033

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